BAUDHĀYANA ŚULBA SŪTRA AND MODERN GEOMETRY A COMPREHENSIVE STUDY

SUMMARY

OF THE

THESIS

Submitted for the award of the degree

of

DOCTOR OF PHILOSOPHY

in

MATHEMATICS

By

YOGITA BANA

Under the Supervision of

Dr. VIJYENDRA KUMAR

Professor & Head



DEPARTMENT OF MATHEMATICS & STATISTICS

GURUKULA KANGRI VISHWAVIDYALAYA

HARDWAR 249 404, UTTARANCHAL (INDIA)

Enrolment No. : 940607 **MARCH, 2005**

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The present work entitled "Baudhāyana Śulba Sūtra and Modern Geometry; A Comprehensive Study" is a study of ancient as well as Modern Mathematics.

In the first chapter a brief introduction of Śulba Sūtra is given. What is Śulba Sūtra? Where are placed Śulba Sūtra? How Śulba Sūtra are related to modern Geometry? These questions are answered in this chapter. Contribution of Śulba Sūtra towards Modern Mathematics is described in this chapter.

The intent of the second chapter is to describe the construction of some geometrical figures from Baūdhayana Śulba Sūtra. These designs are used in the construction of altars.

The third chapter aims at the conversion of one figure to another figure of the same area i.e. the conversion of rectangle into square

and Vice-Versa; circle into square and Vice-Versa etc.

If focuses on how the complicated structures have been simplified in the Śulba Sūtra. Here the endeavour has also been made to high light the method of construction and proof of each Sūtra.

In the fourth chapter Units of measurement and some construction having measurements in Karaṇī, Dvikaraṇī, Trikaraṇī, Trtiyakaraṇī are given.

The fifth chapter explains the construction of Mahāvedi, Sautrāmanivedi and Aśvamedha. In this chapter the dimensions of Mahāvedi, Sautrāmanivedi and Aśvamedha vedi and and their shapes are described. Their areas have been calculated by Śulba Sūtra method and modern method. In each case area comes out to be equal, showing the exactness of the geometrical methods described in Śulba Sūtra.

In the sixth chapter construction of Śyenacit, Prauġa citi, Ratha-cakra citi, Droṇa citi and Kūrma citi is described. First citi is in the shape of falcon, second is in the shape of triangle; third is in the shape of chariot wheel. Fourth is in the shape of circle or square and fifth is in the shape of tortoise. Areas of citis, number of bricks used in different layers etc. are described here.

In the seventh chapter Śulbakarā's theorem and its application to find the value of $\sqrt{2}$ and $\sqrt{5}$ are given. Views of Sen & Bag, Srinivasiengar, Dutta, Thibout, Bürk and Heath about this theorem are also described.